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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/521,762	LOHWEG ET AL.	
	Examiner	Art Unit	
	EUENG-NAN YEH	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _04 November 2008_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _15-36_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _15-36_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _Apr 22, 2008_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 4, 2008 has been entered.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 15-36 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent (*Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876)) and recent Federal Circuit decisions (*In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008)) indicate that a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to

a different state or thing. While the instant claims recite a series of steps or acts to be performed, the claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. In order for a process to be "tied" to another statutory category, the structure associated with another statutory category must be positively recited in a step or steps significant to the basic inventive concept, and NOT just in association with statements of intended use or purpose, insignificant pre or post solution activity, or implicitly. For example the claim 1 comprising the steps: providing a printed image sensor, generating images, providing separate sensor signals, providing calculation, linking signals, generating outputs, forming results, forming weighted differences, classifying output signals, and determining acceptability. Although a printed image sensor for generating images is recited, it does not impose meaningful limits on the method claim's scope which is to process image data. This insignificant image taking activity will not transform an unpatentable principle into a patentable process.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 15, 17, 19, 23, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Juang (US 5,999,636) and Swain et al. (International Journal of Computer Vision 7:11, Nov 1991, 11-32).

Regarding claim 15, Juang discloses a print analysis system comprising:
A printed image sensor; using said printed image sensor for generating separate pixel by pixel image sensor signals of each of first, second and third color channels of a printed image ("It is an object of the present invention to provide an apparatus and process for inspecting printed matter which compares a target image to one or more reference images based on the classification and on the average intensity of each pixel" at column 3, line 2. As depicted in figure 1, numeral 3, "CCD array sensor 3 is triggered to open its shutter when the printing impression reaches the array sensor 3 field of view location. It will be obvious to those skilled in the art that the CCD array sensor 3 may be a single channel (black and white), or a multi-channel (color) array sensor. The array sensor 3 may also be a line sensor, i.e. a line scan camera ... The CCD array sensor 3 serves as an image pick-up device ..." at column 4, line 41. See also, "Flaw detection is applied independently for each digitized pixel intensity of color separated red, green, and blue channels of the CCD sensor" at column 3, line 58);
a separate image sensor signal for each of said first, second and third separated color channels ("Flaw detection is applied independently for each digitized pixel intensity of color separated red, green, and blue channels of the CCD sensor" at column 3, line 58, wherein the red can be the first channel, green the second channel, and blue the third channel);

determining an acceptability of said printed image ("Therefore what is needed is an apparatus and process for inspecting print matter by comparing a target image to one or more reference images based on the classification and on the average intensity of each pixel" at column 2, line 52. As depicted in figure 1, numeral 70, "defect rejecter circuit 70 evaluates the printing defect according to user criteria, and determines whether the printing impression should be accepted or rejected. Warning lights 7 consist of green, yellow, and red lights. Green is used to indicate acceptable printing quality. Yellow is used to warn that the printing quality is starting to degrade. Red is used as an alarm when a rejected printing quality is detected" at column 5, line 7).

Juang does not explicitly disclose a first calculation specification and a second calculation specification.

Swain, in the field of endeavor of color indexing ("Given a discrete color space, a color histogram counts how much of each color occurs in the image" at page 13, section 1.3), teaches an object identification system based on the methodology analogous to human vision, "[t]he color axes used for the histograms were the three opponent color axes, defined as follows (Ballard & Brown 1982):

$rg = r - g$

$by = 2 * b - r - g$

$wb = r + g + b$

Here r, g, and b represent red, green, and blue signals, respectively. The *rg*, *by*, and *wb* axes are analogous to the opponent color axes used by the human visual system …" at Swain page 16, left column, line 1. Test results indicate that "a hypothetical extremely

inexpensive system that operated on very low-resolution images would be able to recognize the dominant object in the image using color about as well as a full-resolution system" at page 18, left column, first full paragraph.

The Swain's methodology includes:

providing a first calculation specification (the first equation described above $rg = r - g$);

linking said first color channel image sensor signal with said second color channel image sensor signal by using said first calculation specification; generating a first output signal of a first resultant compensation color channel using said first calculation specification linked first and second color channel image sensor signals (discussed above, $rg = r - g$, as the first calculation specification and rg is the first output signal. Thus, Swain's methodology takes human vision into consideration by subtracting the second signal color of green from the first signal color of red to generate the first rg output signal);

providing a second calculation specification (the second equation described above $by = 2 * b - r - g$);

linking said third color channel image sensor signal with a combination of said first and second color channel image sensor signals by using said second calculation specification; generating a second output signal of a second resultant compensation color channel using said second calculation specification linked third color channel image sensor signal and said combination of said first and second color channel image signals (discussed above, $by = 2 * b - r - g$, as the second calculation specification

which links red, green, and blue three channels and the result *by* is the second output signal);

forming said first resultant compensation color channel corresponding to a red/green receptive field of color perception of a human eye (discussed above that the *rg*, *by*, and *wb* axes are analogous to the opponent color axes used by the human visual system. The first output signal *rg* corresponding to red/green);

forming said second resultant compensation color channel corresponding to a blue/yellow receptive field of color perception of a human eye (discussed above that the *rg*, *by*, and *wb* axes are analogous to the opponent color axes used by the human visual system. The second output signal *by* corresponding to blue/yellow);

selecting said first calculation specification for forming a weighted difference between said second color channel image sensor signal and said first color channel image sensor signal (as discussed in above said first equation wherein the first output signal *rg* = 1 * r – 1 * g is the weighted difference between red and green);

selecting said second calculation specification for forming a weighted difference between said combination of said first color channel image sensor signal and said second color channel image sensor signal, and said third color channel image sensor signal (as discussed in above said second equation wherein the second output signal *by* = 2 * b - r – g = 2 * b – 1 * (r + g) is the weighted difference between red/green combination and blue).

It would have been obvious at the time the invention was made to one of ordinary skill in the art would have been motivated to include the print analysis system Juang

made with human visual analogous object detection methodology as taught by Swain, such that the classification used by Juang can apply to said first and said second output signals and the acceptability used by Juang can include above said classification because object can be recognized by this inexpensive human visual analogous system reliably as discussed above.

Regarding claim 17, said first, second, and third color channels corresponding to the basic colors of an RGB model wherein R is red, G is green and B is blue (discussed in claim 15, the sensor signals are separated to red, green, and blue as first, second and third color channels, respectively).

Regarding claim 19, said first, second and third color channels with adaptable spectral sensitivity (discussed in claim 15, the three color channels are red, green, and blue, respectively. And the three opponent color axes are *rg*, *by*, and *wb* which are analogous to the opponent color axes used by the human visual system).

Regarding claim 23, weighting each of said first, second and third color channel image sensor signals with a coefficient (discussed in claim 15, weighting factors applied to each color channel image sensor signal).

Regarding claim 35, selecting said images as print images (as discussed in claim 15, said images are print images).

5. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Juang and Swain as applied to claim 15 discussed above, and further in view of Yamaguchi (US 5, 268,753).

Regarding claim 21, the combination of Juang and Swain does not teach a non-linear transformation.

Yamaguchi, in the field of endeavor of color image forming ("reproducing on an image output medium a color image corresponding to an original color image formed on an image input medium" at column 1, line 10), teaches that "In the case where the image input gamut is thus inconsistent with the image output gamut, colors reproduced on the output medium are made different from colors of the original image which has been formed on the input medium, as a result of which color-reproducibility of the image forming apparatus is degraded" at column 2, line 3. Furthermore, "to correct such a color-inconsistency and improve the color-reproducibility of the image forming apparatus, a color-compression processing is generally conducted before the above-described color-proofing" at column 2, line 15. As depicted in figure 4, steps S1 to S7 "... the three primary color component signals are converted into values of CIE-L*a*b* color system in a step S1 ..." at column 9, line 17. Equations 1-3 are three non-linear transformation for L*a*b* colorimetric system.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include the print analysis system of the Juang and Swain combination,

with non-linear transformation as taught by Yamaguchi, in order “to correct such a color-inconsistency and improve the color-reproducibility” at column 2, line 15.

6. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Juang and Swain as applied to claim 15 discussed above, and further in view of Shimura et al. (US 6,486,981 B1).

Regarding claim 25, the combination of Juang and Swain does not teach a low pass filter.

Shimura, in the field of endeavor of color image processing (“color image processing method and apparatus capable of coding and storing color image data" at column 1, line 11), teaches a way to sampling the color image by changing the sampling rate as depicted in figure 6, numerals 85 and 86 for Cb and Cr components: "... input data is subject to the sub-sampling in the sub-sampling units 85 and 86 at the sub-sampling ratio Y:Cb:Cr=4:2:2 ..." at column 8, line 24. This means that the chrominance components Cb and Cr of the pixel data are in half resolution relative to the luminance component Y in a horizontal direction of the image since the human visual system is less sensitive to chrominance than luminance. Furthermore, "uniform color space such as CIE 1976 L*a*b* or CIE 1976 L*u*v* can be employed as the color space besides the YCrCb space described above" at column 11, line 34.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include the print analysis system of the Juang and Swain combination, with low pass filter technique as taught by Shimura to take advantage of the fact that

human visual system is less sensitive to chrominance than luminance. By so doing, the data space can be saved and the processing speed increases.

7. Claims 27, 29, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Juang and Swain as applied to claim 15 discussed above, and further in view of Shiratani (US 6,950,554 B2).

Regarding claim 27, the Juang and Swain combination discloses a print analysis system to determine the acceptability of printed image. The Juang and Swain combination does not explicitly teach the learning function.

Shiratani, in the field of endeavor of automatic image classification ("provide a learning type image classification apparatus" at column 4, line 2), teaches:
providing a learning mode and an inspection mode (depicted in Shiratani figure 2a the learning step and figure 2b the classification step);
forming reference data values of at least one reference printed image using said first and second compensation color channels (discussed in claims 15 and 16, said first and said second output signals of said first and second compensation color channels are classified. As depicted in Shiratani figure 2a, numeral ST108: "the classification parameter learning section 108, a feature vector is prepared from the extracted feature and a classification parameter is learned and determined so that the feature parameter can be classified in accordance with the teacher signal (step ST108)" at column 9, line 21. Thus, the reference data values are formed. Furthermore, "a leaming type image

classification apparatus which is capable of classifying a plurality of images" at column 4, line 12);

storing said reference data values in a reference data memory (as depicted in Shiratani figure 1, numeral 113);

forming inspection images as inspection output signals using said first and second compensation color channels (discussed in claims 15 and 16, said first and said second output signals of said first and second compensation color channels are used for image processing. As depicted in Shiratani figure 2b, steps ST109 to ST112 to form the inspection images);

comparing said inspection output signals with said reference data values in said reference data memory pixel by pixel (depicted in Shiratani figure 2b, steps ST113 "the feature vector of each region is classified by using a classification parameter which has been learned and the category determination section 111 determines to which category the region belongs (step ST113)" at column 9, line 53. Furthermore, "the learning type image classification program which is executed at each section is recorded on the recording medium 113 *(figure 1)*" at column 9, line 62. The region is clipped by user or automatically performed by the system, "... provided a region clipping mode selection section ..." at column 10, line 51. And the clipped region can also be as small as a pixel for pixel-by-pixel processing).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include the print analysis system of the Juang and Swain combination, with automatic learning type image classification technique as taught by Shiratani such

that this learning type image classification system is capable of “alleviating the burden of work” at Shiratani column 4, line 6.

Regarding claim 29, a classification system for comparing said inspection output signals with said reference data values (discussed in claim 27, said inspection output signals were compared with said reference data values for classification).

Regarding claim 31, selecting said classification system from linear and non/linear classification systems including threshold value classifiers, Euclidic distance classifiers, Bayes classifiers, fuzzy classifiers and artificial neuronic networks (“...as a result of the learning of the classification parameter, for example, at a kohonen type neural net, the neuron element corresponds to a representative vector in the vector quantization so that the neuron element is set in a state in which a label representing the classification category name is added to this representative vector ...” at Shiratani column 9, line 30).

8. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Juang, Swain and Shiratani as applied to claim 27 discussed above, and further in view of Buzuloiu et al. (US 6,751,348 B2).

Regarding claim 33, the combination of Juang, Swain and Shiratani, teaches that plurality of images used: “a learning type image classification apparatus which is capable of classifying a plurality of images” at Shiratani column 4, line 12. The

combination of Juang, Swain, and Shiratani does not explicitly disclose the tolerance window.

Buzuloiu, in the field of endeavor of image detection ("pixels of a questionable image are compared with a color reference database" at column 1, line 9), teaches a way to identify the color as depicted in figure 1, numerals 16-18: "block 16, color detection begins by sampling pixels from a questionable image, the reception of which is indicated by input 17, and compares the color of each sampled pixel with the colors in the color prototype database. When a pixel is found to match a color in the color prototype database, a texture analysis is performed in an area around the questionable pixel (block 18). If the area around the pixel is uniform in color within a pre-determined variance, the area is considered to be potentially skin ..." at column 3, line 42. Without departing from the scope and spirit of Buzuloiu's methodology, the variance can be used as the tolerance window.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include the print analysis system of the Juang, Swain and Shiratani combination, with tolerance window as taught by Buzuloiu, to determine the color or "the variance of the surrounding pixels is used as a measure of skin texture" at Buzuloiu column 3, line 57.

9. Claims 16, 18, 20, 24, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Juang (US 5,999,636), Swain et al. (International Journal of Computer Vision 7:11, Nov 1991, 11-32), and Baba et al. (US 6,911,963 B2).

Regarding claim 16, Juang discloses a print analysis system comprising:

A printed image sensor; using said printed image sensor for generating separate pixel by pixel image sensor signals of each of first, second and third color channels of a printed image ("It is an object of the present invention to provide an apparatus and process for inspecting printed matter which compares a target image to one or more reference images based on the classification and on the average intensity of each pixel" at column 3, line 2. As depicted in figure 1, numeral 3, "CCD array sensor 3 is triggered to open its shutter when the printing impression reaches the array sensor 3 field of view location. It will be obvious to those skilled in the art that the CCD array sensor 3 may be a single channel (black and white), or a multi-channel (color) array sensor. The array sensor 3 may also be a line sensor, i.e. a line scan camera ... The CCD array sensor 3 serves as an image pick-up device ..." at column 4, line 41. See also, "Flaw detection is applied independently for each digitized pixel intensity of color separated red, green, and blue channels of the CCD sensor" at column 3, line 58);

a separate image sensor signal for each of said first, second and third separated color channels ("Flaw detection is applied independently for each digitized pixel intensity of color separated red, green, and blue channels of the CCD sensor" at column 3, line 58, wherein the red can be the first channel, green the second channel, and blue the third channel);

determining an acceptability of said printed image ("Therefore what is needed is an apparatus and process for inspecting print matter by comparing a target image to one or more reference images based on the classification and on the average intensity of each

pixel" at column 2, line 52. As depicted in figure 1, numeral 70, "defect rejecter circuit 70 evaluates the printing defect according to user criteria, and determines whether the printing impression should be accepted or rejected. Warning lights 7 consist of green, yellow, and red lights. Green is used to indicate acceptable printing quality. Yellow is used to warn that the printing quality is starting to degrade. Red is used as an alarm when a rejected printing quality is detected" at column 5, line 7).

Juang does not explicitly disclose a first calculation specification and a second calculation specification.

Swain, in the field of endeavor of color indexing ("Given a discrete color space, a color histogram counts how much of each color occurs in the image" at page 13, section 1.3), teaches an object identification system based on the methodology analogous to human vision, "[t]he color axes used for the histograms were the three opponent color axes, defined as follows (Ballard & Brown 1982):

$$rg = r - g$$

$$by = 2 * b - r - g$$

$$wb = r + g + b$$

Here r, g, and b represent red, green, and blue signals, respectively. The *rg*, *by*, and *wb* axes are analogous to the opponent color axes used by the human visual system ..." at Swain page 16, left column, line 1. Test results indicate that "a hypothetical extremely inexpensive system that operated on very low-resolution images would be able to recognize the dominant object in the image using color about as well as a full-resolution system" at page 18, left column, first full paragraph.

The Swain's methodology includes:

providing a first calculation specification (the first equation described above *rg* = r – g);

linking said first color channel image sensor signal with said second color channel image sensor signal by using said first calculation specification; generating a first output signal of a first resultant compensation color channel using said first calculation specification linked first and second color channel image sensor signals (discussed above, *rg* = r – g, as the first calculation specification and *rg* is the first output signal. Thus, Swain's methodology takes human vision into consideration by subtracting the second signal color of green from the first signal color of red to generate the first *rg* output signal);

providing a second calculation specification (the second equation described above *by* = 2 * b - r – g);

linking said third color channel image sensor signal with a combination of said first and second color channel image sensor signals by using said second calculation specification; generating a second output signal of a second resultant compensation color channel using said second calculation specification linked third color channel image sensor signal and said combination of said first and second color channel image signals (discussed above, *by* = 2 * b - r – g, as the second calculation specification which links red, green, and blue three channels and the result *by* is the second output signal);

forming said first resultant compensation color channel corresponding to a red/green receptive field of color perception of a human eye (discussed above that the *rg*, *by*, and *wb* axes are analogous to the opponent color axes used by the human visual system. The first output signal *rg* corresponding to red/green);

forming said second resultant compensation color channel corresponding to a blue/yellow receptive field of color perception of a human eye (discussed above that the *rg*, *by*, and *wb* axes are analogous to the opponent color axes used by the human visual system. The second output signal *by* corresponding to blue/yellow);

selecting said first calculation specification for forming a weighted difference between said second color channel image sensor signal and said first color channel image sensor signal (as discussed in above said first equation wherein the first output signal *rg* = 1 * r – 1 * g is the weighted difference between red and green);

selecting said second calculation specification providing a linkage of first color channel image sensor signal , the second color channel image sensor signal, and said third color channel image sensor signal (as discussed in above said second equation wherein the second output signal *by* = 2 * b - r – g = 2 * b – 1 * (r + g) links red, green, and blue signals).

It would have been obvious at the time the invention was made to one of ordinary skill in the art would have been motivated to include the print analysis system Juang made with human visual analogous object detection methodology as taught by Swain, such that the classification used by Juang can apply to said first and said second output signals and the acceptability used by Juang can include above said classification

because object can be recognized by this inexpensive human visual analogous system reliably as discussed above.

The combination of Juang and Swain does not explicitly teach the concept of minimum value selection between first color, the red, and second color, the green.

Baba, in the field of endeavor of color image display ("relates to a field-sequential color display unit and display method" at column 1, line 15), teaches color display: "display colors of the primary color signals may include red, green and blue, and the display color of the non-three-primary color picture signal may be any one of white, cyan, magenta and yellow which are generated from the at least two primary color signals. The non-three-primary color signal displayed in the sub-field period may be determined on the basis of a part of the input image information in one frame period" at column 4, line 4. And "The non-three-primary color signal generator may include a signal separating circuit separating the three-primary color signals from the input picture signal, and generate the non-three-primary color signal from the three-primary color signals separated by the signal separating circuit" at column 5, line 1. As depicted in figure 5, numeral 16: "...three-primary color signals are inputted to the signal separating circuit 16 to prepare a W signal by the minimum value of the R, G and B signals, a Y signal by the minimum value of the R and G signals ..." at column 11, line 1. With the W, Y, M, and C color used "... non three-primary color picture signals, the color difference there between being smaller than the color difference between the three-primary color picture signals R, G and B, and the intensities of the three-primary color

picture signals R, G and B decrease, so that it is difficult for the observer to perceive color breakup" at column 12, line 8.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include the print analysis system of the Juang and Swain combination, with the Y signal selection between the minimum value of the R and G signals as taught by Baba, in order to "reducing the color breakup of an optical image" at column 3, line 50, and "...it is difficult for the observer to perceive color breakup" at column 12, line 12.

Regarding claim 18 (similar to the discussion for claim 17).

Regarding claim 20 (similar to the discussion for claim 19).

Regarding claim 24 (similar to the discussion for claim 23).

Regarding claim 36 (similar to the discussion for claim 35).

10. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Juang, Swain, and Baba as applied to claim 16 discussed above, and further in view of Yamaguchi (US 5, 268,753).

Regarding claim 22, the combination of Juang, Swain, and Baba does not teach a non-linear transformation.

Yamaguchi, in the field of endeavor of color image forming ("reproducing on an image output medium a color image corresponding to an original color image formed on an image input medium" at column 1, line 10), teaches that "In the case where the image input gamut is thus inconsistent with the image output gamut, colors reproduced on the output medium are made different from colors of the original image which has been formed on the input medium, as a result of which color-reproducibility of the image forming apparatus is degraded" at column 2, line 3. Furthermore, "to correct such a color-inconsistency and improve the color-reproducibility of the image forming apparatus, a color-compression processing is generally conducted before the above-described color-proofing" at column 2, line 15. As depicted in figure 4, steps S1 to S7 "... the three primary color component signals are converted into values of CIE-L*a*b* color system in a step S1 ..." at column 9, line 17. Equations 1-3 are three non-linear transformation for L*a*b* colorimetric system.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include the print analysis system of the Juang, Swain, and Baba combination, with non-linear transformation as taught by Yamaguchi, in order "to correct such a color-inconsistency and improve the color-reproducibility" at column 2, line 15.

11. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Juang, Swain, and Baba as applied to claim 16 discussed above, and further in view of Shimura et al. (US 6,486,981 B1).

Regarding claim 26, the combination of Juang, Swain, and Baba does not teach a low pass filter.

Shimura, in the field of endeavor of color image processing ("color image processing method and apparatus capable of coding and storing color image data" at column 1, line 11), teaches a way to sampling the color image by changing the sampling rate as depicted in figure 6, numerals 85 and 86 for Cb and Cr components: "... input data is subject to the sub-sampling in the sub-sampling units 85 and 86 at the sub-sampling ratio Y:Cb:Cr=4:2:2 ..." at column 8, line 24. This means that the chrominance components Cb and Cr of the pixel data are in half resolution relative to the luminance component Y in a horizontal direction of the image since the human visual system is less sensitive to chrominance than luminance. Furthermore, "uniform color space such as CIE 1976 L*a*b* or CIE 1976 L*u*v* can be employed as the color space besides the YCrCb space described above" at column 11, line 34.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include the print analysis system of the Juang, Swain, and Baba combination, with low pass filter technique as taught by Shimura to take advantage of the fact that human visual system is less sensitive to chrominance than luminance. By so doing, the data space can be saved and the processing speed increases.

12. Claims 28, 30, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Juang, Swain, and Baba as applied to claim 16 discussed above, and further in view of Shiratani (US 6,950,554 B2).

Regarding claim 28, the Juang, Swain, and Baba combination discloses a print analysis system to determine the acceptability of printed image. The Juang, Swain, and Baba combination does not explicitly teach the learning function.

Shiratani, in the field of endeavor of automatic image classification ("provide a learning type image classification apparatus" at column 4, line 2), teaches:

providing a learning mode and an inspection mode (depicted in Shiratani figure 2a the learning step and figure 2b the classification step);

forming reference data values of at least one reference printed image using said first and second compensation color channels (discussed in claim 16, said first and said second output signals of said first and second compensation color channels are classified. As depicted in Shiratani figure 2a, numeral ST108: "the classification parameter learning section 108, a feature vector is prepared from the extracted feature and a classification parameter is learned and determined so that the feature parameter can be classified in accordance with the teacher signal (step ST108)" at column 9, line 21. Thus, the reference data values are formed. Furthermore, "a learning type image classification apparatus which is capable of classifying a plurality of images" at column 4, line 12);

storing said reference data values in a reference data memory (as depicted in Shiratani figure 1, numeral 113);

forming inspection images as inspection output signals using said first and second compensation color channels (discussed in claim 16, said first and said second output signals of said first and second compensation color channels are used for image

processing. As depicted in Shiratani figure 2b, steps ST109 to ST112 to form the inspection images);

comparing said inspection output signals with said reference data values in said reference data memory pixel by pixel (depicted in Shiratani figure 2b, steps ST113 "the feature vector of each region is classified by using a classification parameter which has been learned and the category determination section 111 determines to which category the region belongs (step ST113)" at column 9, line 53. Furthermore, "the learning type image classification program which is executed at each section is recorded on the recording medium 113 *(figure 1)*" at column 9, line 62. The region is clipped by user or automatically performed by the system, "... provided a region clipping mode selection section ..." at column 10, line 51. And the clipped region can also be as small as a pixel for pixel-by-pixel processing).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include the print analysis system of the Juang, Swain, and Baba combination, with automatic learning type image classification technique as taught by Shiratani such that this learning type image classification system is capable of "alleviating the burden of work" at Shiratani column 4, line 6.

Regarding claim 30 (similar to the discussion for claim 29).

Regarding claim 32 (similar to the discussion for claim 31).

13. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Juang, Swain, Baba, and Shiratani as applied to claim 28 discussed above, and further in view of Buzuloiu et al. (US 6,751,348 B2).

Regarding claim 34, the combination of Juang, Swain, Baba, and Shiratani, teaches that plurality of images used: "a learning type image classification apparatus which is capable of classifying a plurality of images" at Shiratani column 4, line 12. The combination of Juang, Swain, Baba, and Shiratani does not explicitly disclose the tolerance window.

Buzuloiu, in the field of endeavor of image detection ("pixels of a questionable image are compared with a color reference database" at column 1, line 9), teaches a way to identify the color as depicted in figure 1, numerals 16-18: "block 16, color detection begins by sampling pixels from a questionable image, the reception of which is indicated by input 17, and compares the color of each sampled pixel with the colors in the color prototype database. When a pixel is found to match a color in the color prototype database, a texture analysis is performed in an area around the questionable pixel (block 18). If the area around the pixel is uniform in color within a pre-determined variance, the area is considered to be potentially skin ..." at column 3, line 42. Without departing from the scope and spirit of Buzuloiu's methodology, the variance can be used as the tolerance window.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include the print analysis system of the Juang, Swain, Baba, and Shiratani combination, with tolerance window as taught by Buzuloiu, to determine the

color or “the variance of the surrounding pixels is used as a measure of skin texture” at Buzuloiu column 3, line 57.

Response to Arguments

<u>a) Summary of Applicant’s Remark</u>:

“Swain does not separate sensor signals into red, green and blue as first, second and third color channels. Swain determines shades of colors containing three opponent color axes” at response page 12, line 21.

<u>Examiner’s Response</u>:

Applicant’s argument is moot in view of the new grounds of rejection advanced herein above. Specifically, the Juang (US 5,999,636) reference now teaches the concept of CCD sensor for red, green, and blue channels to inspect print material. Refer to the rejections above for further discussion.

<u>b) Summary of Applicant’s Remark</u>:

“The representations at the top left of page 16 of the Swain article are not mathematical expressions. They are representations of the opponent color axes along which along which shades of the opponent colors are classified so that they can be divided into shades” at response page 13, line 22.

<u>Examiner’s Response</u>:

As stated at Swain page 16, left column, line 20, “… if $wb = 0$ ($r = g = b = 0$) or $wb = 3M$ ($r = g = b = M$) …”. Thus, these equations are mathematical expressions.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eueng-nan Yeh whose telephone number is 571-270-1586. The examiner can normally be reached on Monday-Friday 8AM-4:30PM EDT.

15. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wenpeng Chen can be reached on 571-272-7431. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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